UNITED STATES PATENT AND TRADEMARK OFFICE

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10/054,652	01/18/2002	Thomas B. Pritchard	10016350 - 1	9419

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HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, CO 80527-2400

EXAMINER
MILIA, MARK R

ART UNIT	PAPER NUMBER
2625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/054,652	PRITCHARD, THOMAS B.
	Examiner	Art Unit	
	Mark R. Milia	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>28 March 2006</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-31</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) <u>29 and 30</u> is/are allowed.

6)☒ Claim(s) <u>1-28 and 31</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   Applicant's amendment was received on 3/28/06 and has been entered and

made of record. Currently, claims 1-31 are pending.

2.   The declaration filed on 3/28/06 under 37 CFR 1.131 is sufficient to overcome

the Ilbery reference (US 2002/0122210).

Information Disclosure Statement

3.   The information disclosure statement filed 3/30/06 fails to comply with 37 CFR

1.98(a)(3) because it does not include a concise explanation of the relevance, as it is

presently understood by the individual designated in 37 CFR 1.56(c) most

knowledgeable about the content of the information, of each patent listed that is not in

the English language. It has been placed in the application file, but the information

referred to therein has not been considered. Particularly, there is no translation of the

Japanese Office Action and therefore cannot be considered by the examiner.

Response to Arguments

4.   Applicant's arguments with respect to claims 1-28 and 31 have been considered

but are moot in view of the current declaration under 37 CFR 1.131 and therefore new

ground(s) of rejection will be made.

5.   Applicant's arguments, see pages 18-19, filed 3/28/06, with respect to the

rejection of claims 29-30 have been fully considered and are persuasive. The rejection

of claims 29-30 has been withdrawn.

Claim Rejections - 35 USC § 102

6.   The text of those sections of Title 35, U.S. Code not included in this action can

be found in a prior Office action.

7.   Claims 1-26 and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by

U.S. Patent No. 6307978 to Metaxas.

Regarding claim 1, Metaxas discloses a method, comprising: partitioning a group

of pixels, corresponding to a group of values, into a plurality of segments, with each of

the segments including a plurality of rows of the pixels (see Figs. 3 and 4, column 3

lines 36-38, and column 4 lines 2-24), halftoning a first plurality of values, corresponding

to a first one of the plurality of rows in a first one of the plurality of segments, to form a

first plurality of error terms (see Figs. 3 and 4 and column 4 lines 7-24), and halftoning,

using at least one of the first plurality of error terms, on a second plurality of values

corresponding to a second one of the plurality of rows in a second one of the plurality of

segments, after completion of the halftoning on the first plurality of values, to form a

second plurality of error terms (see Figs. 3 and 4 and column 4 lines 2-24 and 30-47).

Regarding claim 9, Metaxas discloses an apparatus, comprising: a first

processing device to perform halftoning on a first set of values corresponding to a first

set of pixels (see Fig. 3 and column 4 lines 2-6), a second processing device to perform

halftoning on a second set of values corresponding to a second set of pixels, with ones

of the first set of pixels located adjacent to the second set of pixels and with ones of the

second set of pixels located adjacent to the first set of pixels (see Fig. 3 and column 4

lines 2-6), and a bus arranged for transferring a third set of values, from the halftoning

of ones of the first set of values corresponding to the ones of the first set of pixels, to the

second processing device and for transferring a fourth set of values, from the halftoning

of ones of second set of values corresponding to the ones of the second set of pixels, to

the first processing device (see column 4 lines 2-24 and column 6 lines 61-65).

Regarding claim 31, Metaxas discloses a halftoning apparatus, comprising: first

means for halftoning on a first set of values corresponding to a first set of pixels (see

Fig. 3 and column 4 lines 2-6), second means for halftoning on a second set of values

corresponding to a second set of pixels, with ones of the first set of pixels located

adjacent to the second set of pixels and with ones of the second set of pixels located

adjacent to the first set of pixels (see Fig. 3 and column 4 lines 2-6), and means for

transferring arranged to transfer a third set of values, from the halftoning of ones of the

first set of values corresponding to the ones of the first set of pixels, to the second

means for halftoning and for transferring a fourth set of values, from the halftoning of

ones of second set of values corresponding to the ones of the second set of pixels, to

the first means for halftoning (see column 4 lines 2-24 and column 6 lines 61-65).

Regarding claim 2, Metaxas further discloses wherein the first one of the plurality

of segments and the second one of the plurality of segments include equal numbers of

the pixels (see Fig. 4).

Regarding claim 3, Metaxas further discloses wherein the first one of the plurality

of segments exists adjacent to the second one of the plurality of segments within an

image formed by the plurality of segments (see Figs. 3 and 4) and a boundary at an

interface between the first one of the plurality of segments and the second one of the

plurality of segments forms a substantially straight line within the image (see Figs. 3 and

4, a substantially straight line exists between the plurality of segments in a diagonal

orientation).

Regarding claim 4, Metaxas further discloses wherein the boundary exists

substantially perpendicular to the plurality of rows of the pixels (see Figs. 3 and 4).

Regarding claim 5, Metaxas further discloses wherein the first one of the plurality

of rows and the second one of the plurality of rows exist in alignment within the image

(see Fig. 3 and column 2 lines 23-32).

Regarding claims 6, 10, and 18, Metaxas further discloses wherein the halftoning

includes error diffusion halftoning (see Fig. 3, column 3 lines 36-47, and column 4 lines

2-24).

Regarding claim 7, Metaxas further discloses wherein halftoning of ones of the

plurality of rows in the first one of the plurality of segments, other than the first one of

the plurality of rows, occurs contemporaneously with halftoning of ones of the plurality of

rows in the second one of the plurality of segments, other than the second one of the

plurality of rows (see Figs. 3 and 4 and column 4 lines 2-24)

Regarding claim 8, Metaxas further discloses the first one of the plurality of

segments includes ones of the pixels included in the second ones of the plurality of

segments (see Figs. 3 and 4).

Regarding claim 11, Metaxas further discloses wherein the third set of values

includes error terms generated from the error diffusion halftoning of the ones of the first

set of pixels (see Figs. 3 and 4 and column 4 lines 2-24), and the fourth set of values

includes error terms generated from the error diffusion halftoning of the ones of the

second set of pixels (see Figs. 3 and 4 and column 4 lines 2-24).

Regarding claim 12, Metaxas further discloses wherein the first set of pixels and

the second set of pixels each include equal numbers of the pixels, with the first set of

pixels and the second set of pixels included within an image (see Figs. 3 and 4, column

2 lines 23-32, and column 4 lines 2-24), and with the ones of the first set of pixels

adjacent to the ones of the second set of pixels within the image (see Figs. 3 and 4 and

column 4 lines 2-24).

Regarding claim 13, Metaxas further discloses wherein a boundary at an

interface between the ones of the first set of pixels and the ones of the second set of

pixels forms a substantially straight line within the image (see Figs. 3 and 4, a

substantially straight line exists between the plurality of segments in a diagonal orientation).

Regarding claim 14, Metaxas further discloses wherein the first set of pixels includes a spatial arrangement into a first plurality of rows forming a first segment of the image (see Figs. 3 and 4 and column 4 lines 2-24) and the second set of pixels includes a spatial arrangement into a second plurality of rows forming a second segment of the image, with the ones of the first set of pixels forming a first column adjacent to a second column formed from the ones of the second set of pixels, with the boundary at the interface between the first column and the second column (see Figs. 3 and 4 and column 4 lines 2-24).

Regarding claim 15, Metaxas discloses wherein the first plurality of rows includes a first row located on a first edge of the first segment and the second plurality of rows includes a second row located on a second edge of the second segment, with the first row aligned with the second row in the image (see Figs. 3 and 4) and the first processing device includes a configuration to complete the error diffusion halftoning on the first row before the second processing device begins the error diffusion halftoning on the second row (see Figs. 3 and 4 and column 4 lines 2-24).

Regarding claim 16, Metaxas further discloses wherein the first plurality of rows includes a third row located adjacent to the first row in the first segment (see Fig. 4), the second plurality of rows includes a fourth row located adjacent to the second row in the second segment (see Fig. 4), the second processing device includes a configuration to begin the error diffusion halftoning on the second row before the first processing device

completes the error diffusion halftoning on the third row (see Fig. 4), and the first

processing device includes a configuration to complete the error diffusion halftoning on

the third row before the second processing device begins the error diffusion halftoning

on the fourth row (see Fig. 4).

Regarding claim 17, Metaxas further discloses wherein the first processing

device includes a first halftone processor and the second processing device includes a

second halftone processor (see Fig. 3, column 3 lines 36-38, and column 4 lines 2-6).

Regarding claim 19, Metaxas further discloses a third processing device to

perform halftoning on a fifth set of values corresponding to a third set of pixels (see

Figs. 3 and 4), and a fourth processing device to perform halftoning on a sixth set of

values corresponding to a fourth set of pixels, with ones of the third set of pixels located

adjacent to the fourth set of pixels, with ones of the fourth set of pixels located adjacent

to the third set of pixels, and with the bus coupled to the third processing device and the

fourth processing device for transferring a seventh set of values, from the halftoning of

the ones of the third set of pixels to the fourth processing device, and for transferring an

eighth set of values, from the halftoning of the ones of the fourth set of pixels, to the

third processing device (see Figs. 3 and 4 and column 4 lines 2-24 and 30-47).

Regarding claim 20, Metaxas further discloses wherein the third set of values

includes error terms generated from the error diffusion halftoning of the ones of the first

set of pixels (see Figs. 3 and 4 and column 4 lines 2-24), the fourth set of values

includes error terms generated from the error diffusion halftoning of the ones of the

second set of pixels (see Figs. 3 and 4 and column 4 lines 2-24), the seventh set of

values includes error terms generated from the error diffusion halftoning of the ones of

the third set of pixels (see Figs. 3 and 4 and column 4 lines 2-24), and the eighth set of

values includes error terms generated from the error diffusion halftoning of the ones of

the fourth set of pixels (see Figs. 3 and 4 and column 4 lines 2-24).

Regarding claim 21, Metaxas further discloses wherein the first set of pixels, the

second set of pixels, the third set of pixels, and the fourth set of pixels each include

equal numbers of pixels, with the first set of pixels, the second set of pixels, the third set

of pixels, and the fourth set of pixels included within an image (see column 2 lines 23-

32).

Regarding claim 22, Metaxas further discloses wherein a first boundary formed at

a first interface between the ones of the first set of pixels and the ones of the second set

of pixels forms a substantially straight line within the image (see Fig. 4) and a second

boundary formed at a second interface between the ones of the third set of pixels and

the ones of the fourth set of pixels forms the substantially straight line within the image

(see Fig. 4).

Regarding claim 23, Metaxas further discloses wherein the first set of pixels

includes a spatial arrangement into a first plurality of rows forming a first segment (see

Figs. 3 and 4 and column 4 lines 2-24), the second set of pixels includes a spatial

arrangement into a second plurality of rows forming a second segment, with the ones of

the first set of pixels forming a first column adjacent to a second column formed from

the ones of the second set of pixels, with the first boundary at the interface between the

first column and the second column (see Figs. 3 and 4 and column 4 lines 2-24), the

third set of pixels includes a spatial arrangement into a third plurality of rows forming a

third segment (see Figs. 3 and 4 and column 4 lines 2-24), and the fourth set of pixels

includes a spatial arrangement into a fourth plurality of rows forming a fourth segment,

with the ones of the third set of pixels forming a third column adjacent to a fourth column

formed from the ones of the fourth set of pixels, with the second boundary at the

interface between the third column and the fourth column (see Figs. 3 and 4 and column

4 lines 2-24).

Regarding claim 24, Metaxas further discloses wherein the first plurality of rows

includes a first row located on a first edge of the first segment, the second plurality of

rows includes a second row located on a second edge of the second segment, the third

plurality of rows includes a third row located on a third edge of the third segment, the

fourth plurality of rows includes a fourth row located on a fourth edge of the fourth

segment, with the first row, the second row, the second row, the third row, and the

fourth row aligned within the image (see Figs. 3 and 4, column 3 lines 45-47, and

column 4 lines 2-24), the first processing device includes a configuration to complete

the error diffusion halftoning on the first row before the processing device begins the

error diffusion halftoning on the second row (see Figs. 3 and 4, column 3 lines 45-47,

and column 4 lines 2-24), the processing device includes a configuration to complete

the error diffusion halftoning on the second row before the processing device begins the

error diffusion halftoning on the third row (see Figs. 3 and 4, column 3 lines 45-47, and

column 4 lines 2-24), and the processing device includes a configuration to complete

the error diffusion halftoning on the third row before the processing device begins the

error diffusion halftoning on the fourth row (see Figs. 3 and 4, column 3 lines 45-47, and column 4 lines 2-24).

Regarding claim 25, Metaxas further discloses wherein the first set of pixels includes a third set of pixels and the second set of pixels includes the third set of pixels, with the ones of the first set of pixels located adjacent to the third set of pixels and the ones of the second set of pixels located adjacent to the third set of pixels (see Fig. 4).

Regarding claim 26, Metaxas further discloses wherein the processing device includes a configuration to transfer a fifth set of values, corresponding to a first subset of pixels of the third set of pixels included within the first set of pixels, to the second processing device using the bus (see Fig. 3 and column 4 lines 2-24), the processing device includes a configuration to transfer a sixth set of values, corresponding to a second subset of pixels of third set of pixels included within the second set of pixels, to the first processing device using the bus (see Fig. 3 and column 4 lines 2-24), the processing device includes a configuration to perform the error diffusion halftoning on the sixth set of values (see Fig. 3 and column 4 lines 2-24), and the processing device includes a configuration to perform the error diffusion halftoning on the fifth set of values (see Fig. 3 and column 4 lines 2-24).

Claim Rejections - 35 USC § 103

8.   The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over

U.S. Patent No. 6870642 to Ostromoukhov in view of Metaxas (US 6307978).

Regarding claim 27, Ostromoukhov discloses an imaging device, comprising: an

interface arranged to receive data, corresponding to an image, from a computer (see

Figs. 3-5 and column 4 lines 50-65), a processor configured to generate color values,

corresponding to pixels forming the image, using the data received from the interface

(see column 5 lines 55-60), a processing system arranged to receive the color values

and including a processing device to perform halftoning on a first set of values, included

in the color values, corresponding to a first set of pixels included in the pixels forming

the image to form a first set of halftone values (see column 6 lines 56-67), a processing

device to perform halftoning on a second set of values, included in the color values,

corresponding to a second set of pixels included in the pixels forming the image to form

a second set of halftone values (see column 6 lines 37-67), with ones of the first set of

pixels located adjacent to the second set of pixels and with ones of the second set of

pixels located adjacent to the first set of pixels (see column 6 lines 37-67), an image

forming mechanism configured to form the image using the first set of halftone values

and the second set of halftone values (see column 5 lines 4-12), and memory to store

the color values, the first set of halftone values, and the second set of halftone values

(see column 7 lines 1-3).

Ostromoukhov does not disclose expressly a first processing device and a

second processing device and a bus coupling the first processing device and the

second processing device for transferring a third set of values from the halftoning of the

ones of the first set of pixels to the second processing device and for transferring a

fourth set of values from the halftoning of the ones of the second set of pixels to the first

processing device.

Metaxas discloses a first processing device and a second processing device (see

column 4 lines 2-6) and a bus coupling the first processing device and the second

processing device for transferring a third set of values from the halftoning of the ones of

the first set of pixels to the second processing device and for transferring a fourth set of

values from the halftoning of the ones of the second set of pixels to the first processing

device (see column 4 lines 2-24 and column 6 lines 61-65).

Ostromoukhov & Metaxas are combinable because they are from the same field

of endeavor, halftoning using error diffusion.

At the time of the invention, it would have been obvious to a person of ordinary

skill in the art to combine multiple processors and transferring of values, as described

by Metaxas, with the system of Ostromoukhov.

The suggestion/motivation for doing so would have been to provide a faster and

less time consuming process for halftoning images (see column 1 lines 41-46 of

Metaxas).

Therefore, it would have been obvious to combine Metaxas with Ostromoukhov

to obtain the invention as specified in claim 27.

Regarding claim 28, Metaxas further discloses wherein the halftoning includes

error diffusion halftoning (see Figs. 3 and 4, column 3 lines 36-38, and column 4 lines 2-

24), the third set of values includes error terms generated from the error diffusion

halftoning of the ones of the first set of pixels (see Figs. 3 and 4, column 3 lines 36-38,

and column 4 lines 2-24), the fourth set of values includes error terms generated from

the error diffusion halftoning of the ones of the second set of pixels (see Figs. 3 and 4,

column 3 lines 36-38, and column 4 lines 2-24), the first set of pixels and the second set

of pixels each include equal numbers of the pixels, with the first set of pixels and the

second set of pixels and with the ones of the first set of pixels adjacent to the ones of

the second set of pixels within the image (see Figs. 3 and 4, column 3 lines 36-38, and

column 4 lines 2-24), and a boundary at an interface between the ones of the first set of

pixels and the ones of the second set of pixels forms a substantially straight line within

the image (see Figs. 3 and 4, column 3 lines 36-38, and column 4 lines 2-24)

Allowable Subject Matter

9.   Claims 29 and 30 are allowed.

10.   The following is a statement of reasons for the indication of allowable subject

matter:

The examiner believes that it would not have been obvious to one of ordinary

skill in the art at the time the invention was made to combine the first through fourth

halftone processors associated with first through fourth printheads and printhead drivers

that transfer error terms obtained by performing error diffusion halftoning between the

first and second processor, the second and third processor, and the third and fourth

processor, with the other limitations as set forth in the claims.

Conclusion

11.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. To further show the state of the art refer to the attached Notice of

References Cited.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Mark R. Milia whose telephone number is (571) 272-

7408. The examiner can normally be reached M-F 8:00am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Twyler M. Lamb can be reached at (571) 272-7406. The fax number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mark R. Milia
Examiner
Art Unit 2625

MRM

JOSEPH R. POKRZYWA
PRIMARY EXAMINER